

## CLAIMS

What we claim:

1. A device for coupling and for fracturing optical fibers, comprising:
  - a housing for receiving a first end of a first optical fiber and a second end of a second
  - 5 optical fiber;
  - a moveable member capable of moving with respect to the housing;
  - a first electrode coupled to the moveable member and having a first electrode surface;
  - a second electrode connected to the housing and having a second electrode surface;
  - the first and second electrodes being positioned so that the first and second ends of
  - 10 the first and second optical fibers, respectively, are located adjacent to each other and between the first and second electrode surfaces of the first and second electrodes;
  - the first and second electrodes are capable of receiving an electrical signal and passing a current through the first and second ends of the first and second optical fibers;
  - the current fusing the first and second ends of the first and second optical fibers
  - 15 together to form a single optical fiber; and
  - a cutting surface positioned such that upon movement of the moveable member, the single fiber is cut to form the first and second optical fibers having the first and second ends, respectively.
- 20 2. The device as set forth in claim 1, wherein the first electrode is an anode and the second electrode is a cathode.
3. The device as set forth in claim 1, wherein the first electrode is positive and

the second electrode is negative.

4. The device as set forth in claim 1, wherein the cutting surface is positioned on the first electrode surface, the second electrode surface, or both.

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5. The device as set forth in claim 1, wherein the moveable member moves in a circular motion.

6. The device as set forth in claim 1, wherein the moveable member moves in a linear motion.

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7. The device as set forth in claim 1, wherein the moveable member is comprised of a conductive material and serves as the first electrode.

8. The device as set forth in claim 1, wherein the housing includes a port extending to the first and second ends of the first and second optical fibers for directing a fluid or gas to the first and second ends of the first and second optical fibers.

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9. The device as set forth in claim 1, further comprising a fluid dispensing device for delivering a fluid or gas to the port.

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10. The device as set forth in claim 1, further comprising a signal generator for providing the electrical signal to the first and second electrodes.

11. The device as set forth in claim 1, wherein the housing is for receiving a plurality of optical fibers each having an end, the first and second electrodes positioned adjacent to the ends of multiple pairs of optical fibers, and the first and second electrodes for  
5 fusing the pairs of optical fibers to form single fibers.

12. The device as set forth in claim 1, further comprising a sleeve for receiving the first and second ends of the first and second optical fibers, wherein the sleeve is positioned between the first and second electrodes.

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13. A method for coupling and for fracturing optical fibers, comprising:  
positioning a first optical fiber having a first end;  
positioning a second optical fiber having a second end so that the first end of the first optical fiber is adjacent to the second end of the second optical fiber and the first and second  
15 ends of the first and second optical fibers are between first and second electrodes;

passing an electrical signal across the first and second electrodes causing a current to flow between the first and second electrodes;

using the current to fuse the first and second ends of the first and second optical fibers together to form a single optical fiber; and

20 moving a moveable member to cut through the single fiber to form the first and second optical fibers having the first and second ends.

14. The method as set forth in claim 13, further comprising rotating the moveable

member to cut the single fiber to form the first and second optical fibers having the first and second ends, respectively.

15. The method as set forth in claim 13, further comprising moving in a linear  
5 direction the moveable member to cut the single fiber to form the first and second optical fibers having the first and second ends, respectively.

16. The method as set forth in claim 13, further comprising providing a fluid or  
gas to the first and second ends of the first and second optical fibers while passing the  
10 electrical signal.

17. The method as set forth in claim 13, further comprising fusing a plurality of  
pairs of optical fibers.

15 18. A system for coupling and fracturing optical fibers, comprising:  
a housing for receiving a first end of a first optical fiber and a second end of a second  
optical fiber;  
a moveable member capable of moving with respect to the housing;  
a first electrode coupled to the moveable member and having a first electrode surface;  
20 a second electrode connected to the housing and having a second electrode surface;  
the first and second electrodes being positioned so that the first and second ends of  
the first and second optical fibers, respectively, are located adjacent to each other and  
between the first and second electrode surfaces of the first and second electrodes;

the first and second electrodes are capable of receiving an electrical signal and passing a current through the first and second ends of the first and second optical fibers;

the current fusing the first and second ends of the first and second optical fibers together to form a single optical fiber;

5 a cutting surface positioned such that upon movement of the moveable member, the single fiber is cut to form the first and second optical fibers having the first and second ends, respectively;

a fluid dispensing device for delivering a fluid or gas to the first and second ends of the first and second optical fibers; and

10 a signal generator for providing an electrical signal to the first and second electrodes.

19. The system as set forth in claim 18, further comprising a sleeve for receiving the first and second ends of the first and second optical fibers, wherein the sleeve is positioned between the first and second electrodes.

15 20. The system as set forth in claim 18, wherein the housing is for receiving a plurality of optical fibers each having an end, the first and second electrodes positioned adjacent to the ends of multiple pairs of optical fibers, and the first and second electrodes for fusing the pairs of optical fibers to form single fibers.

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